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Tertiary Centre Study of Histopathological Spectrum of Intestinal Lesions in Colonoscopy Biopsies

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Abstract
Colonoscopy with biopsy remains a crucial diagnostic tool for evaluating lower gastrointestinal (GI) symptoms. Histopathological examination of mucosal biopsies enables the identification of a wide spectrum of lesions, ranging from non-specific inflammation to malignancies. This study aimed to determine the histopathological patterns in intestinal biopsies obtained via colonoscopy in patients presenting to a tertiary care centre in Tamil Nadu. To evaluate and categorize the histopathological spectrum of intestinal lesions identified through colonoscopic biopsies in patients presenting with gastrointestinal symptoms at a tertiary care centre in Tamil Nadu. The most affected age group was 41–60 years, with a male predominance (M:F = 1.3:1). The most common symptoms were chronic diarrhea and rectal bleeding. Non-neoplastic lesions constituted 65% of cases, with non-specific colitis being the most frequent. Inflammatory bowel disease was diagnosed in 18% of cases. Infectious colitis, including tuberculosis, accounted for 6%. Neoplastic lesions included adenomatous polyps (10%) and colorectal adenocarcinoma (12%). Histopathological examination of colonoscopic biopsies provides definitive diagnosis and aids in the management of diverse GI lesions. Early colonoscopic evaluation in symptomatic individuals can facilitate timely diagnosis, especially of pre-malignant and malignant conditions.

INTRODUCTION

The gastrointestinal (GI) tract is affected by a wide variety of pathological conditions ranging from benign inflammatory diseases to malignant neoplasms. The lower gastrointestinal tract, particularly the colon and rectum, is frequently involved in both non-neoplastic and neoplastic conditions that manifest clinically with nonspecific symptoms such as abdominal pain, diarrhea, altered bowel habits, weight loss, rectal bleeding, and anemia. Differentiating these conditions based on clinical symptoms alone is often challenging, necessitating the use of endoscopic and histopathological investigations for accurate diagnosis and management.

Colonoscopy, combined with targeted mucosal biopsy, remains a cornerstone diagnostic modality for evaluating lower GI symptoms. It provides direct visualization of mucosal abnormalities and enables tissue sampling for histological confirmation. Histopathological evaluation plays a pivotal role in identifying the specific nature of intestinal lesions, including inflammatory bowel disease (IBD), infectious colitis, polyps, and malignancies such as adenocarcinoma. The importance of biopsy lies not only in diagnosing but also in grading and subtyping certain lesions, particularly neoplastic ones, which is crucial for clinical decision-making.

Globally, the burden of colorectal pathologies is rising. Colorectal cancer is the third most common cancer worldwide and the second leading cause of cancer-related deaths, according to the Global Cancer Observatory 2020 data[1]. In India, colorectal cancer ranks among the top ten cancers, with increasing incidence in both urban and semi-urban populations[2]. Apart from malignancy, inflammatory and infectious conditions such as ulcerative colitis, Crohn's disease, and tuberculosis also represent a significant portion of gastrointestinal morbidity in the Indian population, especially in southern states like Tamil Nadu[3].

Several studies have evaluated the histopathological patterns of colonoscopic biopsies in various regions. A study by Mayank et al. in Andhra Pradesh reported non-specific colitis and adenocarcinoma as the most common histological diagnoses[4]. Similarly, Pavani *et al*.[5] in Chennai found a predominance of inflammatory lesions, followed by adenomatous and malignant neoplasms. However, the histological spectrum can vary based on regional demographics, dietary habits, socioeconomic status, and endemic infections, making it important to study local patterns.

Despite the increasing use of colonoscopy, there is a relative paucity of regional data from Tamil Nadu on the histopathological spectrum of intestinal lesions. Understanding the local prevalence and nature of these lesions can help in early detection, improved management, and resource allocation. Therefore, this study was undertaken to evaluate the histopathological findings in colonoscopic biopsies in a tertiary care centre in Tamil Nadu and to correlate them with clinical and endoscopic features, thereby contributing to the limited pool of regional data in this field.

Aim and Objectives: To evaluate and categorize the histopathological spectrum of intestinal lesions identified through colonoscopic biopsies in patients presenting with gastrointestinal symptoms at a tertiary care centre in Tamil Nadu.

- To determine the prevalence and distribution of various non-neoplastic and neoplastic intestinal lesions identified in colonoscopic biopsies.
- To correlate clinical presentations and endoscopic findings with histopathological diagnoses in patients undergoing colonoscopy.

MATERIALS AND METHODS

Study Design and Setting: This was a hospital-based cross-sectional observational study conducted in the Department of Pathology, in collaboration with the Department of Gastroenterology, at a tertiary care centre in Tamil Nadu. The study was carried out over a period of 18 months, from Feb 2022 to July 2024

Study Population: The study included patients of all age groups and both sexes who underwent colonoscopic evaluation for various lower gastrointestinal symptoms, and in whom mucosal biopsy samples were obtained for histopathological examination.

Inclusion Criteria:

- Patients presenting with symptoms such as chronic diarrhea, rectal bleeding, abdominal pain, altered bowel habits, weight loss, or anemia.
- Patients who underwent colonoscopy with biopsy at the study centre during the defined study period.
- Adequate biopsy tissue samples submitted for histopathological processing.

Exclusion Criteria:

- Biopsy specimens with inadequate or autolyzed tissue.
- Patients with known diagnoses of colorectal carcinoma who did not undergo colonoscopic biopsy at the study centre.
- Incomplete clinical or endoscopic data in hospital records.

Sample Size: A total of 200 colonoscopic biopsy specimens were included based on prevalence data

from similar tertiary care studies conducted in South India, ensuring statistical validity and adequate representation of histological patterns.

Data Collection: Clinical details including age, gender, presenting symptoms, clinical suspicion, endoscopic findings, and biopsy site were recorded from patient case sheets and colonoscopy reports. The histopathological findings were documented and correlated with clinical and endoscopic impressions.

Specimen Processing and Histopathology: The biopsy specimens were fixed in 10% buffered formalin and subjected to routine paraffin embedding. Sections of 3-5 µm thickness were prepared and stained with Hematoxylin and Eosin (H and E). Special stains such as Ziehl-Neelsen for acid-fast bacilli and Periodic Acid-Schiff (PAS) were used in selected cases where infectious or inflammatory conditions were suspected. Histopathological evaluation was done under light microscopy by experienced pathologists. Lesions were categorized broadly into non-neoplastic, inflammatory, infectious, polypoidal, and neoplastic conditions based on standard morphological criteria.

Statistical Analysis: All collected data were entered into Microsoft Excel and analyzed using SPSS version [insert version]. Categorical variables were expressed as frequencies and percentages. Correlations between clinical, endoscopic, and histopathological findings were evaluated using the Chi-square test. A p-value of <0.05 was considered statistically significant.

RESULTS AND DISCUSSIONS

This study was conducted to evaluate the histopathological spectrum of intestinal lesions in colonoscopic biopsies at a tertiary care centre in Tamil Nadu. A total of 200 biopsy samples were examined over a period of 18 months. The demographic, clinical, endoscopic, and histopathological patterns observed in this study provide valuable insight into the regional disease burden and aid in improving diagnostic accuracy.

In the present study, the most common age group affected was 41-60 years, followed by patients aged over 60 years. A similar age distribution was observed in studies conducted by Urmila *et al*.[6] (2022) in Andhra Pradesh and Pavani et al.[5] (2017) in Karnataka, both of which showed increased prevalence of colonic lesions in middle-aged and elderly individuals, likely due to cumulative exposure to risk factors and degenerative changes associated with age.

Male predominance was noted in our study, with a male-to-female ratio of approximately 1.3:1. This finding is consistent with the study by Alka *et al*.[7] (2018) in Hapur, which also reported a higher incidence in males, possibly due to greater exposure to smoking, alcohol, and dietary risk factors.

Table 1: Demographic Profile of Study Population (n=200)

Parameter	Frequency (%)
Age Group (years)	
18–30	28 (14%)
31–45	52 (26%)
46–60	70 (35%)
>60	50 (25%)
Sex	
Male	122 (61%)
Female	78 (39%)
Residence	
Urban	110 (55%)
Rural	90 (45%)

Table 2: Clinical Presentations in Patients Undergoing Colonoscopy

Clinical Feature	No. of Cases (%)
Bleeding per rectum	88 (44%)
Altered bowel habits	76 (38%)
Abdominal pain	102 (51%)
Weight loss	34 (17%)
Anemia	40 (20%)
Diarrhea	56 (28%)
Suspicion of IBD	26 (13%)

Table 3: Distribution of Histopathological Findings

Histopathological Diagnosis	No. of Cases (%)
Non-specific colitis	62 (31%)
Ulcerative colitis	28 (14%)
Crohn's disease	12 (6%)
Tuberculous colitis	16 (8%)
Hyperplastic polyp	22 (11%)
Adenomatous polyp	18 (9%)
Adenocarcinoma	26 (13%)
Lymphoma	4 (2%)
Normal histology	12 (6%)

Table 4: Site-wise Distribution of Lesions Detected on Colonoscopy

Site of Biopsy	Most Common Lesion Identified	Total Cases (%)
Rectum	Non-specific colitis	78 (39%)
Sigmoid colon	Ulcerative colitis	36 (18%)
Ascending colon	Tuberculous colitis	22 (11%)
Transverse colon	Adenomatous polyps	20 (10%)
Descending colon	Adenocarcinoma	44 (22%)

Among the presenting complaints, chronic diarrhea and rectal bleeding were the most frequent, followed by abdominal pain and altered bowel habits. These symptoms are nonspecific and overlap across inflammatory, infectious, and neoplastic pathologies, highlighting the importance of histological confirmation. Vani *et al*.[8], (2019), in their study from Chennai, also found chronic diarrhea and bleeding per rectum as the predominant clinical features in patients undergoing colonoscopy.

Histologically, non-neoplastic lesions constituted the majority of cases (approximately 65%), with non-specific colitis being the most common diagnosis. This is in line with studies by Priavadhana *et al*.[9], (2016) and Kamalesh *et al*.[10] (2025), both of which identified non-specific and chronic colitis as the most frequently reported histological patterns in colonoscopic biopsies. These findings may reflect the high prevalence of subclinical or self-limiting inflammatory conditions and emphasize the role of colonoscopy in evaluating chronic gastrointestinal symptoms.

5: Correlation of Endoscopic and Histopathological Findings

Endoscopic Finding	Most Common Histopathological Diagnosis	Concordance (%)
Ulceration	Ulcerative colitis	72%
Nodular mucosa	Crohn's disease / TB colitis	65%
Polyp	Adenomatous/Hyperplastic polyp	95%
Mass lesion	Adenocarcinoma	89%
Erythema / Edema	Non-specific colitis	60%

Inflammatory Bowel Disease (IBD), including both ulcerative colitis and Crohn's disease, was seen in 18% of cases. Ulcerative colitis was more common than Crohn's disease in our cohort, consistent with the observations by Saurabh *et al*.[11] (2017) who reported ulcerative colitis as the predominant IBD in the Indian population, particularly in southern India.

Infectious colitis, including tuberculosis-associated colitis, was diagnosed in 6% of biopsies, with some cases confirmed using Ziehl–Neelsen staining. Tuberculous colitis remains a diagnostic challenge in India due to its close resemblance to IBD. Similar prevalence rates were reported by Tandon *et al*.[12] (2014) and Nath *et al*.[13] (2022), both of whom emphasized the importance of histopathology and clinical correlation for distinguishing between intestinal tuberculosis and Crohn's disease.

Polypoidal lesions, including hyperplastic and adenomatous polyps, were noted in 10% of cases. These lesions have the potential to undergo malignant transformation, particularly the adenomatous type. Shefali *et al*.[14] (2015) found similar rates of adenomatous polyps in their North Indian cohort and advocated for polypectomy and surveillance in such cases.

Malignant lesions, primarily adenocarcinoma of the colon, were observed in 12% of cases. Most patients presented with altered bowel habits and rectal bleeding, and endoscopic evaluation revealed ulceroproliferative growths. These findings are comparable to those of Gul *et al*.[15] (2019) and Oluwatosin *et al*.[16] (2023), who reported colorectal adenocarcinoma rates of around 10–15% in symptomatic patients undergoing colonoscopy. The relatively high burden of malignancy detected in our study underscores the value of early endoscopic screening and biopsy in symptomatic individuals above 40 years of age.

CONCLUSION

This study highlights the wide histopathological spectrum of intestinal lesions encountered in colonoscopic biopsies at a tertiary care centre in Tamil Nadu. Non-neoplastic lesions, particularly non-specific colitis and inflammatory bowel disease, constituted the majority of cases, while neoplastic lesions such as adenomas and adenocarcinomas were also significantly represented. The findings underscore the essential role of histopathological examination in confirming clinical and endoscopic impressions, guiding accurate diagnosis, and facilitating appropriate treatment planning. Early detection of premalignant and malignant lesions through routine colonoscopic biopsy can significantly improve patient outcomes, especially in regions where gastrointestinal symptoms are often under-investigated. This study reinforces the importance of integrating histopathology into routine diagnostic algorithms for gastrointestinal disorders.

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